A SYNOPSIS OF THE GENUS CRYPTOGLOSSA SOLIER (COLEOPTERA: TENEBRIONIDAE)

By C. A. Triplehorn[1]

A large number of specimens belonging to the genus *Cryptoglossa* Solier have accumulated in collections since Blaisdell (1945) revised the group. Many of these were taken in long series and come from areas hitherto unreported. As a result of this study, certain relationships within the genus have become clearer, necessitating several nomenclatural changes.

This genus is composed of a small number of moderately large species inhabiting the arid portions of the Sonoran Region of southwestern United States and adjacent portions of Mexico and Baja California. They are distinguished from the closely related genus *Centrioptera* Mannerheim by the form of the terminal antennal segment. In *Centrioptera* this segment is globular and as long as or longer than the penultimate segment; in *Cryptoglossa* it is smaller, truncate apically and partially retracted into an excavation of the penultimate segment which greatly exceeds it in size.

A sexual character which has not been reported previously was discovered. Males have tufts of long silken hairs on antennal segments 4, 5 and 6 while females have fewer and shorter hairs, not forming tufts, on these segments. Neither male nor female genitalia was found to be useful in distinguishing between the closely related taxa recognized in this paper.

This study has been based primarily on specimens from the following institutions: California Academy of Science (CAS), Cornell University (CU), Florida State Collection of Arthropods (FSCA), Long Beach State College (LBSC), Michigan State University (MSU), Museum of Comparative Zoology (MCZ), New Mexico State University (NMS), The Ohio State University (OSU), University of California (UCal), the United States National Museum (USNM) and from my own field work in Texas sponsored by the American Philosophical Society (Grant Number 3091, Penrose Fund). Grateful acknowledgment is made to the various individuals in charge of the above collections.

Catalog of Known Species of Cryptoglossa[2]

Cryptoglossa Solier, 1836, p. 680 (type: *C. bicostata* Solier, by monotypy).

Asbolus LeConte, 1851, p. 129 (type: *A. verrucosus* LeConte, NEW DESIGNATION).

1. *bicostata* Solier, 1836, p. 681, pl. 24, figs. 11-13.

2a. *verrucosa verrucosa* (LeConte), 1851, p. 129. *(Asbolus).*

2b. *verrucosa carinulata* Blaisdell, 1945, p. 25.

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[2] Blaisdell (1945) published complete literature citations to the above taxa; for the sake of brevity, they are not repeated here.

3a. *laevis laevis* (LeConte), 1851, p. 130. *(Asbolus).*
laevis subsimilis Casey, 1924, p. 308. [NEW SYNONYMY.]

3b. *laevis papillosa* NEW SUBSPECIES.

4a. *mexicana mexicana* Champion, 1884, p. 73, pl. 3, fig. 21.

4b. *mexicana granulifera* Champion, 1892, p. 508. [NEW COMBINATION & STATUS.]

5. *angularis* (Horn), 1894, p. 414, pl. 7, fig. 4. *(Centrioptera)*

Key to the Known Species and Subspecies of Cryptoglossa.

1. Fifth elytral interval forming an unbroken costa from base to one-third the distance from apex; other intervals with conical tubercles ---------- BICOSTATA
   Fifth elytral interval never costate but may have series of disconnected elongate costules ---------- 2
2. Disc of pronotum gibbous ---------- 3
   Pronotum depressed, evenly convex from side to side ---------- 6
3. Elytral intervals strongly verrucose or cariniform; pronotum densely, granulately punctured, somewhat pruinose ---------- 4
   Elytra smooth or minutely granulate; pronotum finely, inconspicuously punctate ---- 5
4. Sculpture of elytral intervals consisting of coarse, distinctly separated conical tubercles ---------- VERRUCOSA VERRUCOSA
   Sculpture of elytral intervals consisting of finer, more or less continuous carinae medially; laterally broken up into smaller, isolated, elongate carinules -------- ---------- VERRUCOSA CARINULATA
5. Elytra with punctures simple, except laterally with an incomplete row of large conical or coarsely granulate tubercles; dorsal luster shining ---------- LAEVIS LAEVIS
   Elytra with punctures distinctly granulate, more coarsely so laterally; dorsal luster dull ---------- LAEVIS PAPILLOSA
6. Elytra with outer elytral intervals strongly tuberculate; all intervals convex --- ANGULARIS
   Elytra smooth and indistinctly striate; punctation diffuse; intervals flat ---------- 7
7. Elytral punctures simple ---------- MEXICANA MEXICANA
   Elytral punctures granulate or muricate ---------- MEXICANA GRANULIFERA

Phylogenetic Relationships

There are presumably two basic lines of evolution in the genus *Cryptoglossa,* both clearly delimited by the form of the prothorax. In the *mexicana* group, the pronotum is relatively flattened with the sides deplanate and the lateral margins clearly visible throughout their length in dorsal aspect. Further evolution has apparently taken place from the smooth and simply punctured *mexicana* Champion through a gradually more muricate or granulate type of puncture *(granulifera* Champion) to the strongly sculptured *angularis* Horn. Series of specimens may be arranged which illustrate this transition very nicely.

In the *laevis* group, the disc of the pronotum is always strongly gibbous with the sides abruptly arising from the lateral margin so that the marginal bead is somewhat concealed in dorsal aspect. Evolution in this group parallels that of the previous one in that there is a progression from a simple through a granular type of elytral punctation to a muricate type.

The presumed relationships are presented on Plate 2, Figure 1. The main branches 1 and 1′ indicate the relatively flattened versus the gibbous form of the pronotum. 2 and 2′ are the verrucose versus the smooth elytral sculpture. 3 and 3′ represent sulcate as opposed to flattened elytral intervals.

The remaining relationships indicated are not as sharply defined as those of the main branches. The use of the trinomials in three of the species does not necessarily reflect the same degree of relationship to the nominate subspecies in each case. In all probability, the three are but extreme forms of their respective species. In fact, the trend from simple to granulate punctation (*mexicana* to *granulifera* and *laevis* to *papillosa*) and tuberculate to carinate elytral intervals (*verrucosa* to *carinulata*) is gradual in all three and occasional specimens cannot be placed in either subspecies with certainty. Nevertheless, this variation appears to be geographic in nature and hence worthy of trinomial designation. It is interesting to note the repetition of the same pattern of variation in the two main lines of evolution.

The transition from *mexicana* through *granulifera* to *angularis* is not difficult to visualize. Perhaps with further collecting, the last will prove to be only a subspecies. At present, existing cabinet material indicates a distinct species.

Cryptoglossa bicostata Solier is omitted from this discussion and from the phylogenetic chart because of the uncertainty of its identity.

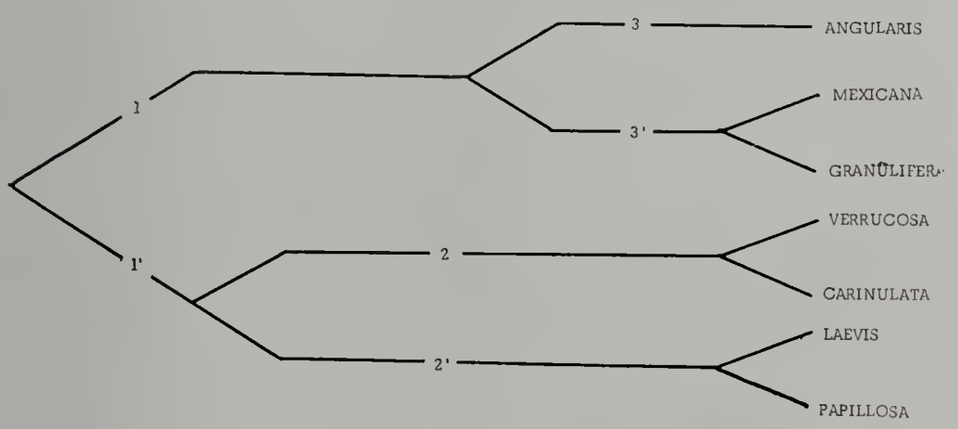

FIGURE 1—Probable evolution in *Cryptoglossa*.

DESCRIPTIONS AND DISTRIBUTIONS

Cryptoglossa bicostata Solier

This species was described from a single mutilated specimen from Mexico. As far as is known, no other specimen has been found so that the positive identification of the species, and, for that matter, the genus, is still in doubt. The antennae were missing from the type when the species was described; these structures are necessary to separate *Cryptoglossa* from the closely related genus *Centrioptera*. It is quite possible that the specimen described and figured by Solier belongs to *Centrioptera* but that problem will not be solved in this paper. His figure shows an insect strongly resembling *Centrioptera spiculifera* LeConte but which also looks like *Cryptoglossa angularis* Horn. The strongly carinate fifth elytral interval is unique however, and it seems best to defer any decisions at the generic level until such time as the identity of this species is established.

Cryptoglossa verrucosa verrucosa (LeConte)
(Figs. 2, 7)

A common and moderately large, opaque and more or less pruinose species. The elytra have nine series of rather large and subacute tubercles (Blaisdell, 1943, p. 223). The greatest variation observable in this nominate subspecies is in the form of the conspicuous elytral tubercles. Typically, these are rather bluntly conical and distinctly separated from one another. In some specimens there is a tendency toward reduction in height and fusion at the base of these tubercles to form a series of acute costae, particularly pronounced in those nearest the elytral suture. Intensive collecting would perhaps demonstrate a gradient in the form of elytral sculpture from the typical "verrucose" to the "carinulate" type of the subspecies *carinulata* (see remarks below).

Blaisdell (1945, p. 24) records this subspecies from numerous localities in southern California, Arizona and Nevada. He did not list any records from Mexico in his 1945 paper but earlier (1943, p. 223) cited Horn's (1894, p. 348) record from San Jose del Cabo, Baja California. I have not seen any specimens from that far south and consequently this record does not appear on the distribution map.

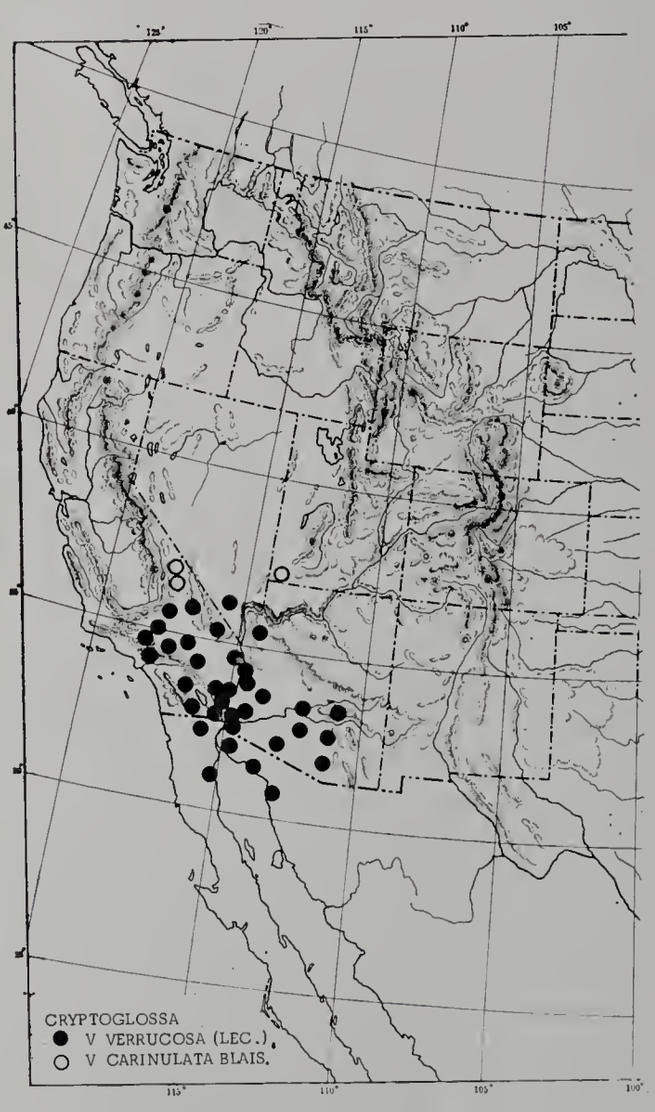

Figure 2—*Cryptoglossa* distribution.

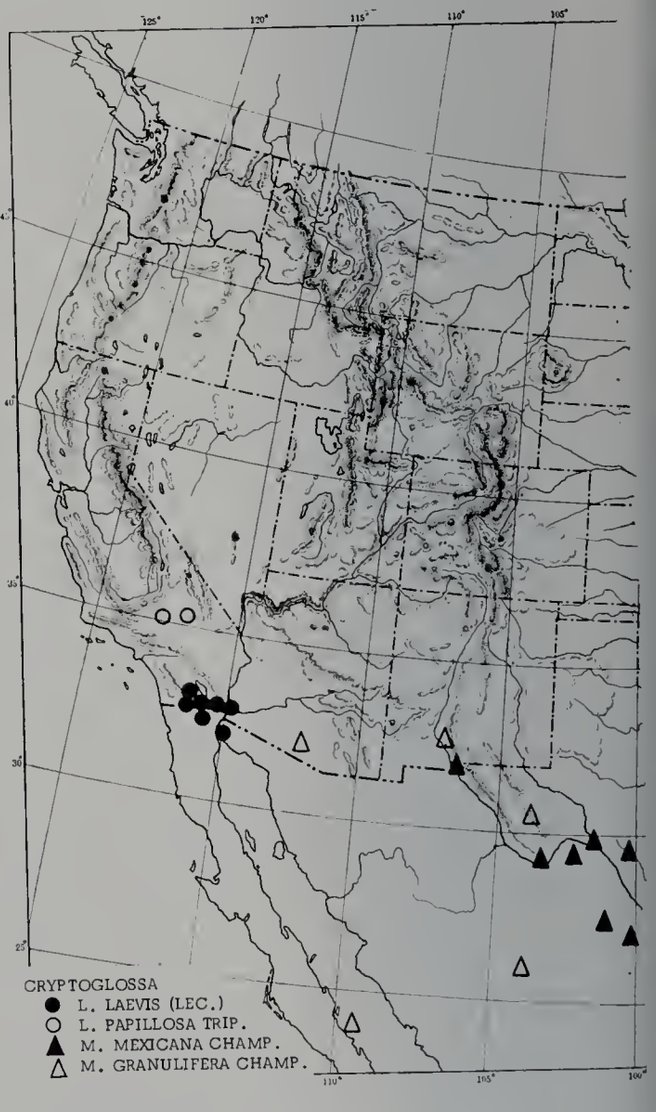

Figure 3—*Cryptoglossa* distribution.

From outside the range of this subspecies as listed by Blaisdell (1945, p. 24), I can add the following records: UNITED STATES: *Arizona:* (1) Globe, June 30, D. K. Duncan (CU); (1) Santa Rita Mts. (CU); *California:* (1) Inyo Co., Shoshone, April 5, 1928. T. Craig (CAS); (1) San Bernadino Co., Trona, May-June, 1925, MacDonald (CU); (1) Kern Co., Mojave, December 12, 1917, J. C. Bradley (CU); (1) San Diego Co., Painted Canyon, May 25, 1941, D. J. & J. N. Knull (OSU); MEXICO: *Sonora:* (90) Desemboque, July 17-September 10, 1953, B. Malkin (CAS); (3) Estero de Sargente, 25 km. south of Desemboque, August 11, 1953, B. Malkin (CAS); (6) Cholla Bay, February 5, 1960, E. Kirschbaum (CAS); (3) 25 mi. south of San Luis, June 4-5, 1949, J. R. Slevin (CAS); (1) Punta Peñasco, May 8, 1946, J. R. Slevin (CAS); *Baja California:* (1) 5 mi. northwest of Punta San Felipe, June 9, 1955, J. R. Slevin (CAS); (2) 3 mi. north of San Felipe, May 21, 1957, J. R. Slevin (CAS); (1) Laguna Salada, May 17, 1958, E. L. Sleeper (LBSC); (4) Mexicali, April 2 (CU).

Cryptoglossa verrucosa carinulata Blaisdell
(Figs. 2, 8)

This appears to be a fairly well-defined and rather disjunctive geographic race, worthy of a name. Here the tubercles of the elytral intervals are fused and elongated to form more or less continuous low carinae on the disc of the elytra. Laterally the tubercles are distinctly separated but still retain the elongate, narrowly costate form.

In a large series of typical *verrucosa,* the tendency for the tubercles to fuse and form low costae is occasionally seen in scattered individuals from southern California. Those from Arizona and Mexico almost invariably have the subacute tubercles. The present subspecies is known from the area of Death Valley, Inyo County, California, and from St. George, in extreme southwestern Utah. Four specimens (CU) from the latter area uniformly correspond more closely to *carinulata* than to the nominate subspecies.

Cryptoglossa laevis laevis (LeConte)
(Figs. 3, 9)

This is a moderately large, shining black, smooth species with at least a row of rather strongly muricate punctures just above the lateral margins at the base of the elytra. These punctures become progressively smaller and are not continued to the elytral apex. In form *laevis* resembles *verrucosa,* particularly in the shape and convexity of the pronotum. It occurs within the range of *verrucosa,* having been taken in extreme southern California (Imperial and San Diego Counties), at Yuma, Arizona, and in the adjacent portions of Mexico (Los Medanos and Laguna Salada in Baja California, and 25 miles south of San Luis in Sonora). Blaisdell (1945) failed to mention any Mexican records.

The subspecies *subsimilis* Casey (1924) is not worthy of separation. A series of 31 specimens taken at Los Medanos, [Baja] California, May 22-24, 1951 by J. R. Slevin (CAS) demonstrates that the characters men-

tioned by Casey are merely normal variations within the species. The relative length of legs and body proportions to which he alluded in his two specimens are apparently sexual. The legs are slightly longer and body narrower in the male but even these characters are subject to variation. As Blaisdell (1945, p. 27) points out, there is even some confusion as to which of the two forms Casey's description applies but he considered it "best to give Col. Casey the benefit of the doubt as it is merely a subspecies." There is actually no justification for this.

Occasional specimens are encountered in which the elytral punctures are granulate instead of simple. The tendency toward this type of puncture appears to begin at the flanks and progress toward the suture. If only a few granular punctures are present on a specimen, they are always lateral in position. A specimen from Grays Wells, Imperial County, California (OSU), has the elytral punctation almost entirely granular and appears to be intermediate between this and the following subspecies.

Cryptoglossa laevis papillosa NEW SUBSPECIES

(Fig. 3)

Similar in form to *C. laevis* but much duller in luster and with the elytral punctures all strongly granular and diffuse. Only three specimens, all from San Bernardino County, California, show this extreme modification. I regard this as but an extreme form of the nominate subspecies, but since it is geographically disjunctive, I provide it with a name to define relationships within the genus.

Without intermediate forms, this would undoubtedly have been described as a distinct species. Champion was perfectly justified in describing *granulifera* as distinct from *mexicana* with the material he had before him. The present situation is similar.

The three specimens studied are designated as follows: Holotype (male) and allotype (female), Barstow, California, May 17, E. S. Ross (CAS); 1 paratype (female), Kelso Dunes, California, May 25, 1958, E. L. Sleeper (LBSC).

Cryptoglossa mexicana mexicana Champion

(Figs. 3, 4)

This is a moderately large, broad species, dull to feebly shining in luster and with the dorsum much flatter than in *laevis* and *verrucosa*. Punctation of the elytra is variable. In specimens from the type locality (Monclova, Coahuila, Mexico) the punctures are simple except in the humeral region where they are minutely granular or muricate (J. Balfour-Browne, in litt.). I have observed this same type of punctation on specimens from Sierra de los Burros, Coahuila (CAS).

On August 15, 1962, Dr. Howard V. Weems, Jr., and I were collecting insects at night around an abandoned house at Oak Spring, in the Chisos

Mountains, Big Bend National Park, Brewster County, Texas. Thirteen specimens of *Cryptoglossa* were taken, most of them crawling up from under the floor of a screened back porch of the house. They are presumably nocturnal since previous collecting at the same site in daylight hours several days before was totally unproductive.

A careful study of the above mentioned series revealed a rather striking range of variation in the punctation of the elytra. In four specimens the punctures are simple with a slightly muricate tendency on the anterior margins. In five of them the punctures are distinctly muricate, and in the remaining four, the punctures are in the form of fine granules. It would seem, therefore, that the variation exhibited by this series ranges from the typical *mexicana* punctation through a gradient with its highest development exemplified by *granulifera.*

Specimens from this series which exhibited the above variation were submitted to Mr. J. Balfour-Browne who very kindly compared them with the Champion types in the British Museum of Natural History. He states that "they agree excellently with the four types of *mexicana,* all from Monclova, Coahuila." He also added that the elytral punctures of the types are more clearly punctiform and more distinctly serially arranged than those of the Texas specimens.

Blaisdell (1945) did not recognize *C. mexicana* as occurring north of the Rio Grande but referred all of his specimens of this complex to *granulifera* after commenting upon the range of variation in elytral punctation which they exhibited. Through the courtesy of Mr. Hugh B. Leech of the California Academy of Sciences, it has been possible to study the specimens Blaisdell had before him. Blaisdell's specimens from Coahuila and El Paso, Texas, are referrable to the present nominate subspecies and all of the others to subspecies *granulifera.* These two taxa are not sharply defined, one from the other. My initial impulse was to synonymize the name *granulifera* in the face of the bewildering variations encountered. On the other hand, I have never seen specimens from the United States with simple elytral punctures except from the Big Bend area and El Paso, Texas. In order to clarify the relationships within the genus it seems best to retain the name *granulifera.*

Specimens examined and assigned to the nominate subspecies are as follows: UNITED STATES: *Texas:* (13) Oak Spring, Chisos Mts., Big Bend National Park, August 15, 1962, C. A. Triplehorn and H. V. Weems, Jr. (OSU, FSCA), (1) Chisos Basin, Big Bend National Park, August 12, 1962, W. E. and C. A. Triplehorn (OSU), (1) Big Bend National Park, September 29, 1952, Peter Koch (OSU), (1) Chisos Mts., July 22, J. W. Green (OSU), (3) Black Gap, Big Bend National Park, July 10, 1960, R. A. Scheibner (MSU), (1) El Paso, June, 1884 (CAS), (1) El Paso, March 14, 1941 (USNM); (1) El Paso, May 18, 1957, J. W. Green (USNM); Sabinal, June, 1910, F. C. Pratt (USNM), (1) Val Verde Co., Pecos River Bridge on U.S. 90, October 8, 1958, H. V. Weems, Jr. (FSCA). MEXICO: *Coahuila:* (2) Sierra de los Burros, June 8 and 18, 1938, Rollin H. Baker (CAS); *Nuevo Leon:* Sabinas Hidalgo, June 15, 1939, Ralph Haag, cave in bat dung (MCZ).

Cryptoglossa mexicana granulifera Champion
(Figs. 3, 5)

The status of this taxon has been summarized under the nominate subspecies. I have restricted this name to include only those specimens in which the granular type of elytral punctation prevails. This is a rather poorly defined geographic race, represented in collections which I have seen by but a few specimens as follows: UNITED STATES: *Arizona:* (1) Ajo Mts., October 16, 1934, Bryant (CAS); *New Mexico:* (5) Las Cruces

Figures 4-9, *Cryptoglossa* spp. All shown to same scale. 4—*C. mexicana mexicana* Champion; Chisos Mts., Texas. 5—*C. mexicana granulifera* Champion; Isla Partida, Gulf of California. 6—*C. angularis* (Horn); La Paz, Baja California. 7—*C. verrucosa verrucosa* (LeConte); near Desemboque, Sonora, Mexico. 8—*C. verrucosa carinulata* Blaisdell; Death Valley, California (PARATYPE). 9—*C. laevis laevis* (LeConte); Los Medanos, Baja California. (Photographs by Robert B. Welch, Department of Photography, The Ohio State University.)

(NMS), (1) Las Cruces, August 15, D. J. and J. N. Knull (OSU); (3) Las Cruces, May 1, 1917, T. E. Snyder (USNM); *Texas:* (1) Fort Davis, June 23, 1949, W. C. Stehr (Ohio University). MEXICO: *Baja California:* (1) Isla la Partida, June 26, 1921, Virgil Owen (CAS).

The specimens from which the original description was taken are from Villa Lerdo, Durango, Mexico. J. Balfour-Browne stated (in litt.) that the type series of *mexicana* and *granulifera* are "very uniform as to the elytral sculpture within each series." He concurs with my decision to regard the two forms as extremes of one species.

Cryptoglossa angularis (Horn)
(Fig. 6)

From all of the known species, *angularis* differs in having the hind angles of the pronotum distinctly everted and the lateral margins in front of them slightly reflexed (Blaisdell, 1945). The elytral intervals are subsulcate with coarse tubercles along their crests. These tubercles are more strongly developed laterally than on the disc.

The previous distribution given by Blaisdell (1945) was La Paz, Santiago, and Catavina, all in Baja California. I have seen only the La Paz specimen. In addition, I am assigning a specimen identified by Blaisdell as *C. granulifera,* and mentioned under that name in his 1945 synopsis, to the present species. The specimen is from Borrego Canyon, San Diego County, California, March 22, 1930, B. Templeton (CAS). It is actually somewhat intermediate in regard to elytral sculpture between the extreme forms of *mexicana (granulifera)* and the true *angularis* which I know only from the one specimen plus Horn's description and figure. Nevertheless, by Blaisdell's own brief diagnosis, this specimen from California is a perfectly good *angularis*. Until additional specimens become available from northern Baja California and southern California, it seems advisible to regard this as a distinct species. Further collecting will perhaps provide intermediate forms and prove *angularis* to be but a further extreme modification of the *mexicana-granulifera* line of evolution.

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BOOK REVIEW

MONOGRAPHIE DES "ANILLINI," BEMBIDIIDAE ENDOGÉS (COLEOPTERA TRECHIDAE). By René Jeannel. Mémoires du Muséum National d'Histoire Naturelle (Paris), n.s., Sér. A., Zoologie, t. 28, fasc. 2, pp. 33-204, 360 figs., 1963.

In the inimitable way in which he can view a world fauna and draw generalizations from it, Jeannel has monographed the tiny, soil-inhabiting carabids of the subtribe Anillina (Bembidiini). Although he published a major paper on the group in 1937 (*Rev. francais d'Ent.* 3:241-394, 245 figs.) and reviewed the African and Madagascan genera in 1957 (*Ann. Mus. Congo Belge,* Zool., 52, 68 pp., 91 figs.), the availability of much additional material prompted a complete revision. Anillines are very small (1-2 mm), testaceous, wingless, and usually eyeless. They occur almost exclusively in deep humus or soil in forests of the temperate zones or at high elevations in the tropics. Material is rare because most anillines are highly localized and because the special techniques of the soil zoologist are required to collect large series.

An earlier classification of the anillines into Anillina and Scotodipnina, based on the umbilicate (marginal) series of setiferous punctures of the elytra, has been abandoned. Although the umbilicate chaetotaxy is still important, Jeannel now believes that the presence (Aphaenodontes) or absence (Phanerodontes) of a tooth on the mentum provides a more natural basis for establishing a primary subdivision. As is his custom, Jeannel has grouped supposedly related genera into phyletic series, of which there are eleven for the anillines. Forty-two genera and 137 species are recognized. Twenty genera were previously proposed by Jeannel himself, and he establishes 9 more here. Generic boundaries seem well chosen, even though the average number of species per genus is low (15 genera are monobasic), and the geographic distributions of the genera are rather restricted. When more specimens have been collected, future revisions will certainly be necessary, but they will probably not result in any substantial reduction in the number of genera or species.

Both ecological and taxonomic evidence suggest a very low mobility for anillines. The pattern of generic distribution indicates appreciable antiquity with intermediate extinction for most of the lineages of the subtribe. Jeannel regards the anillines as relics of eyed, winged carabids inhabiting the humus of the Cretaceous forests. During the cooling, drying trend of the later Cenozoic they became adapted to an endogenous mode of life, losing eyes and wings and becoming stenohygrobic in the process.

The known anillines are most numerous and varied in Europe, Africa, and the Indo-Australian region. They are notably absent from glaciated regions of the Northern Hemisphere and from eastern Asia, and are rather poorly represented in the Americas. In the continental United States there are now 4 genera—*Anillinus* Casey (6 spp., southeast), *Anillodes* Jeannel (4 spp., Texas and California), *Anillaspis* Casey (2 spp., California), and *Micranillodes* Jeannel (1 sp., Texas).

This revision opens the way for a more intensive investigation of a difficult but potentially rewarding group of beetles. Although much shorter than Jeannel's classic, exhaustive "Monographie des Trechinae" (*L'Abeille,* 1928-30), it is fully comparable in depth, and will stand as the definitive work on the anillines for years to come.—THOMAS C. BARR, JR., University of Kentucky, Lexington, Kentucky.